

**National Center for Higher Education Management Systems** 

# Retention and Transfer in Colorado's Public Colleges and Universities

Patrick J. Kelly Matthew A. Crellin

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## Retention and Transfer in Colorado's Public Colleges and Universities

#### October 3, 2012

As higher education policymakers and stakeholders in Colorado begin to focus more on college completion (rather than just access) to better prepare the state's residents and workforce for an increasingly knowledge-based and globally-competitive economy, it is imperative to support the effort with sound data and information. In Colorado, and across the nation, two of the most critical milestones for college students in their pursuit of a college degree are returning for their second year of study, and transferring from a two- to four-year college for community college students who wish to earn bachelor's degrees. It is not unusual for first-to-second year retention and transfer to dominate much of the conversation about higher education policy.

In most systems of postsecondary education, the largest percentage of students who drop out do so between the first and second years of college - exiting the system early in their college careers rather than later. First-year retention has been researched perhaps more than any other facet of higher education. The topic has dominated conferences among institutional researchers, admissions staff, student service providers, and others for decades. There are even entire conferences and workshops devoted just to retention in fact, attended by many of these same professionals (e.g. the Education Policy Institute's Retention 101). By nearly all accounts, there is a firm belief among policymakers and practitioners that improving first-year retention rates is one of the most crucial interventions for students and overall college completion rates. There is far too much literature to review in this relatively focused document, but highlights will be brought to bear as needed and most appropriate.

Many state systems of higher education utilize community and technical colleges in a variety of ways. One of the most common is providing relatively short-term training opportunities for more tradeoriented occupations in the areas of building, construction, automotive repair, production and transportation, etc. Another is to provide shorter-term technical training for entry-level (but relatively high-paying) occupations that are in high demand such as computer and information technologies, allied health technologies, etc. Some community colleges play a primary role in states for serving undereducated adults through adult basic education (ABE) and English as a second language (ESL) programs. Finally, in most states (including Colorado) two-year colleges carry a large responsibility to prepare students to transfer into baccalaureate programs in order to fulfill the goal of completing a four-year degree. In this regard, community colleges serve as the gateway for students who are not initially academically prepared to enter directly into most four-year institutions, place-bound students who must live close to home in order to support families and work, and students in families that cannot afford (at least initially) the cost of attendance at four-year institutions. Despite the circumstances that drive these students into community colleges, many of them aspire to attain a bachelor's degree. The nexus between two-and four-year institutions is one of the most complex in higher education. More in-depth discussion regarding the challenges associated with transfer, and the appropriate roles of state policymakers, colleges, and universities in facilitating transfer are provided in this report.

The purpose of this report is to provide a detailed analysis of retention and transfer for the Colorado public system of postsecondary education. While institution-level performance on these two milestones for students is important, the primary unit of analysis is the "system" of public colleges and institutions. This focus is appropriate since students often enroll in multiple institutions throughout their college

careers. Nationally, students on average enroll in three or more institutions in pursuit of undergraduate degrees (Adelman 2000). A major shortcoming and criticism of much of the publicly available data sources on retention and transfer is that they are aggregations of institution-level results - leaving out much of the activity associated with student attending multiple institutions on their path to completion. For this study, eleven years of student unit record data (provided by the Colorado Department of Higher Education) are utilized to determine the most influential predictors of first-year retention and transfer from two- to four-year institutions. The categories of predictors include demographic characteristics, levels of preparation in high school, student and family income, intensity of enrollment, academic success in the first year of college, and regional differences across the state. While private non-for-profit and for-profit institutions account for 27% of the undergraduate enrollment in Colorado, they are not included in the analyses because they do not provide student-level data to Colorado Department of Higher Education's (CDHE) Student Unit Record Data System (SURDS). In order to elevate the readership of this report beyond statistically savvy academics, it is written (to the best of our ability) largely for a lay audience - e.g. others interested in the performance of the state's higher education enterprise and those who are engaged in the formulation of public higher education policy.

The following section contains a description of the data set and methods used to determine the predictors of retention and transfer in Colorado's public postsecondary education system.

#### Data and Methods Used

The CDHE provided NCHEMS with student-level data for each academic term (semester) from fall 2000 to fall 2010. The terms include summer, fall, and spring semesters (and in some cases abbreviated winter and summer terms). Data were provided from the SURDS student characteristics, enrollment, degree completion, and financial aid files. In order to ensure the privacy of students in the transfer of data and in the analyses, CDHE de-identified data by encrypting the social security numbers of students, i.e. applying an internally generated algorithm to the SSNs that could not be interpreted by NCHEMS. In addition, student names were not provided. Appropriate protocols and agreements were formalized between CDHE and NCHEMS regarding the uses of these data and the destruction of them within a defined period of time following the study. More information about SURDS, and descriptions of the data elements in each of these files can be accessed at http://highered.colorado.gov/i3/More/Docs.aspx

A variety of simple descriptive analyses were conducted that gauge change over time and the differences in retention and transfer rates among a variety of student subpopulations. In these analyses retention and transfer rates are disaggregated by gender, race/ethnicity, age-group, federal Pell grant status, state grant status, institutional grant status, student loan status, remedial course placement, academic program major, credit hours accumulated in the first academic year, and grade point average in the first academic year. For retention at public four-year institutions, we were able to include rates by students' entering ACT Composite scores, high school GPAs, and high school ranks. These data were not routinely collected by the two-year institutions during the time periods we received from CDHE; and there were not enough cases to include in the analyses.

For first-to-second year retention, data used in the analyses include first-time students beginning in the 2000-01 through 2008-09 academic years. For transfer, the analyses include the 2000-01 to 2007-08 beginning cohorts. Many students beginning after 2007-08 would not have had time to transfer by the 2009-10 academic year – the most recent year of data provided by CDHE.

The following calculations were conducted to determine first-year retention and two- to four-year transfer:

- **First-to-Second Year Retention** = First-time students beginning in any term during the academic year (fall, spring, summer terms) who are enrolled in any term during the following academic year. Enrollment status in the second year includes enrollment in any public institution, accounting for students who may transfer to another institution in year two. This approach is much more inclusive than the retention rates reported to the federal IPEDS database, which includes only students who begin in the fall semester who enroll the following fall semester within the same institution only.
- **Two- to Four-Year Transfer** = First-time students beginning at community colleges in any term during the academic year (fall, spring, summer terms) who are enrolled at a public four-year institution in any term during subsequent academic years. If students are enrolled in multiple institutions at the time they are enrolled in the four-year institution, they must have more credit hours at the four-year institution in order to be counted as a transfer. All beginning cohorts (from 2000-01 forward) were tracked through the 2009-10 academic year.

Binary Logistic Regression analyses were conducted to determine the predictors of first-to-second year retention of students beginning at public community colleges and four-year institutions, and two to four-year transfer of students beginning at community colleges. The logistic regression procedure enables the calculation of the probability of an event occurring (in this case retention and transfer) as a result of a variety of student characteristics – i.e. demographic characteristics, income and financial aid characteristics, enrollment intensity and academic success in the first year of college, and levels of preparation in high school. The dependent and independent variables for each of the three logistic regression models are shown in Figure 1 below.

Figure 1: Logistic Regression Models – Dependent and Independent Variables Used

Dependent Variables					
Model 1: First-to-Second Year Retention Rates of Community College Students	Model 2: First-to-Second Year Retention Rates of Four-Year Students	Model 3: Two- to Four-Year Transfer of Community College Students			
	Independent Variables (Predictors)				
Gender	Gender	Gender			
Race/Ethncity	Race/Ethncity	Race/Ethncity			
Age	Age	Age			
Federal Pell Grant	Federal Pell Grant	Federal Pell Grant			
State Need-Based Grant	State Need-Based Grant	State Need-Based Grant			
Institutional Grant	Institutional Grant	Institutional Grant			
Student Loan	Student Loan	Student Loan			
Two or More Remedial Courses	Two or More Remedial Courses	Two or More Remedial Courses			
First-Year Grade Point Average	First-Year Grade Point Average	First-Year Grade Point Average			
First-Year Credit Hours Accumulated	First-Year Credit Hours Accumulated	First-Year Credit Hours Accumulated			
	High School Grade Point Average	Community College Distance from			
	High School Rank	Nearest Four-Year Institution			
	ACT Composite Scores				
	Sector (Research vs. Bachelor's and				
	Masters Institutions)				

A more detailed discussion of the regression models and the results are provided below.

## **Findings - Descriptive Statistics**

Figure 2 displays the first- to second-year retention rates for the public two and four-year colleges in Colorado for the cohorts beginning as first-time students in the academic years 2000-01 through 2008-09. Retention rates at community colleges have steadily increased over the past decade (from 46.6% 55.9%), while those at the four-year colleges have remained steady at roughly 85%. The first two cohorts represented for the universities are based on relatively small numbers because SURDS data did not have nearly as many records that contained ACT scores and high school rank and GPA – key variables used as predictors in the regression analyses discussed below.

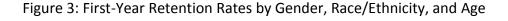
100 88.2 90 85.6 85.4 85.4 85.3 85.1 84.6 84.4 79.4 80 70 60 55.9 54.4 54.0 53.2 53.6 53.3 51.7 49.0 50 46.6 40 Four-Year Retention Two-Year Retention 30 20

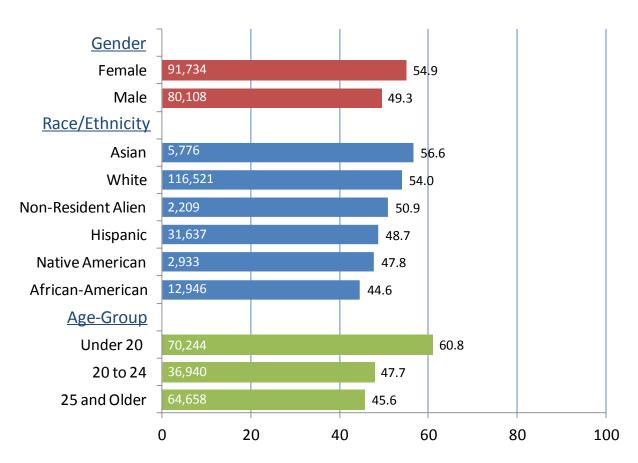
Figure 2: First-Year Retention Rates at Two- and Four-Year Institutions – from 2000-01 to 2008-09

#### Retention at Public Two-Year Colleges

First- to second-year retention rates vary substantially across different subpopulations. Success rates are more than five percentage points higher for females than males (Figure 3). Whites and Asians are much more likely to be retained than under-represented minorities (Blacks, Hispanics, and Native Americans). More than 60% of the students who enter college soon after high school (before the age of 20) are retained, compared to less than half of those who delay their college entry for several years (Figure 3).

2000-01 2001-02 2002-03 2003-04 2004-05 2005-06 2006-07 2007-08 2008-09





Lower income students who were awarded federal and state need-based financial aid exhibit substantially higher retention rates than those without it. Compared to their counterparts, nearly 15 percent more of first-time students with federal Pell grants return their second year, and 20 percent more of those with state grants return. Though fewer students received institutional grant aid, they are far more likely to be retained than those without it. And those who received loans to subsidize their education have much higher retention rates than those who do not. These relationships can be explained in large part by age - community college students who are awarded grant aid (in any form) and loans are much younger and tend to enroll full-time at much higher rates than older adults (discussed in more detail below). Figure 4 displays retention rates by financial aid and loan status.

Figure 4: First-Year Retention Rates by Financial Aid and Loan Status

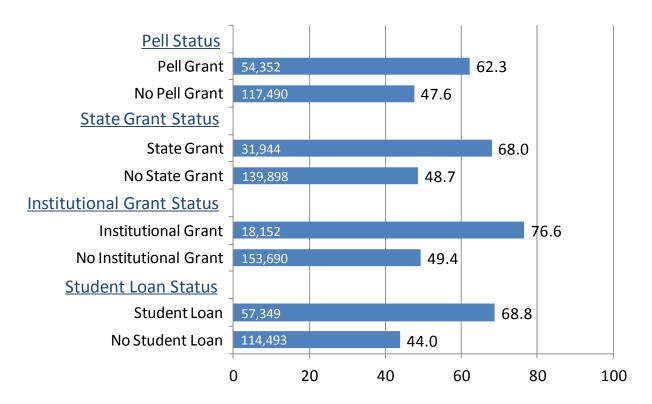
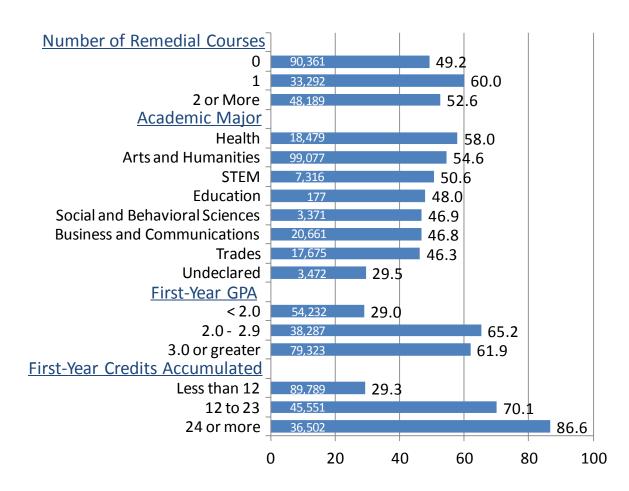


Figure 5 displays retention rates by a variety of characteristics associated with the first-year student experience: the number of remedial courses students are placed into, the academic majors they choose, the grade point averages students earn in their first year, and the number of credit hours they accumulate. Surprisingly, students who require one remedial course have substantially higher retention rates than those who don't. However, retention rates are lower for those who require two or more remedial courses - though still slightly higher than those that require none. This result is likely to reflect a phenomenon where students seeking a more traditional path though education - degree-seeking, full-time enrollment, younger aged, etc. - are more likely to be assessed for remedial education than non-traditional students who enter community colleges with less clear goals. The data are not available to determine whether this is the case or not.

Figure 5: First-Year Retention Rates by Remedial Status, Academic Major, and First-Year GPA and Credit Hour Accumulation



The vast majority of students who declare a major in arts and humanities have relatively high retention rates compared to students in most other majors. This result may be due in part because this academic category contains many of the students who are pursuing transfer to four-year institutions. Those who major in health fields have the highest retentions rates; while those students majoring in social and behavioral sciences, business and communications, and trades have the lowest retention rates.

Academic success and enrollment intensity in students' first-year both make an enormous difference in retention rates at community colleges. Less than a third of students with less than a 2.0 grade point average persist to their second year, compared to nearly two-thirds who achieve a 2.0 GPA or higher. The relationship between credit hour accumulation and retention is even stronger. Students who earn 12 to 23 credit hours in their first year have retention rates that are 40 percentage points higher than those who earn less than 12 credit hours. Nearly 90 percent of students who earn 24 or more credit hours are retained in their second year - approaching rates exhibited at fairly selective four-year institutions. The need (and ways) to incentivize more community college students to enroll full-time, or close to full-time, are among the top priorities of major higher education philanthropies such as Lumina and the Bill and Melinda Gates foundations, as well national organizations such as Complete College America and the National Governors Association that are working with states across the U.S. to improve college completion.

Figure 6 displays the first-year retention rates for community college students by their region of origin - where they lived prior to their first enrollment at an institution. Unlike in some of the more selective four-year universities, the vast majority of students in community colleges originate from close by; so these regional patterns largely reflect the locations of institutions as well.

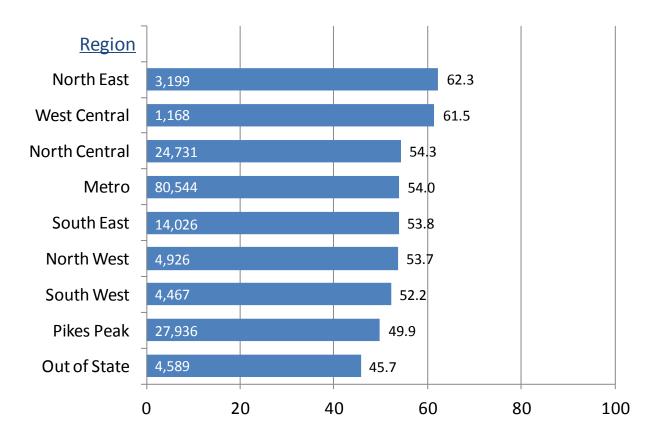


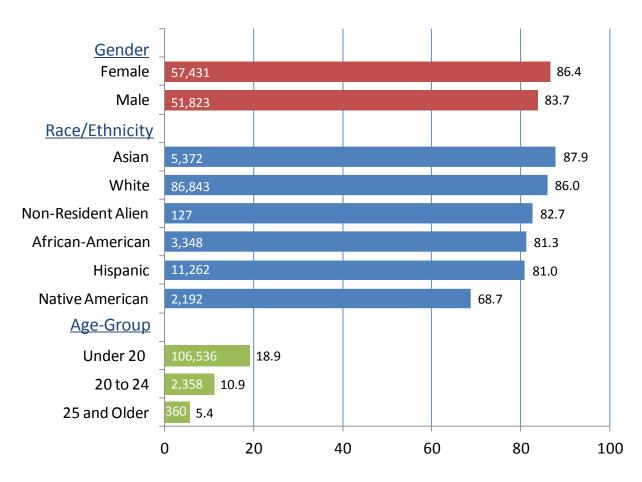
Figure 6: First-Year Retention Rates by Student Region of Origin

Though small in numbers, students from the North East and West Central regions of the state have the highest retention rates, and those from the Pikes Peak region have the lowest. Students from the Metro area - the vast majority of community college students -return their second year at about the rate of the system as a whole.

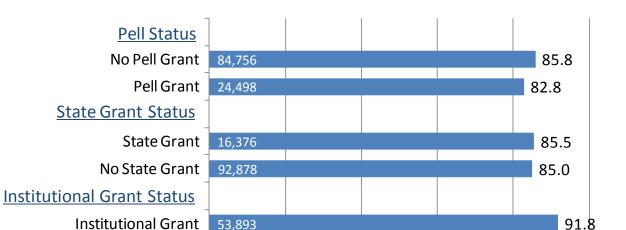
#### Retention at Public Four-Year Institutions

At public four-year institutions, the gap in retention rates is not as wide between females and males - less than 3 percentage points. Whites and Asians have substantially higher retention rates as Hispanics, African-Americans, and Native Americans - a similar pattern as the two-year colleges. Students who enroll as first-time students before the age of 20 are much more likely to be retained in year two. However, there are few students who enter four-year institutions at or above the age of 20.

Figure 7: First-Year Retention Rates by Gender, Race/Ethnicity, and Age



Unlike at the two-year institutions, students who receive state and federal financial aid are not likely to be younger in age, or be enrolled in a more traditional manner during their first year. State and Pell Grant recipients are slightly less likely to be retained - but not as much as one might expect. Comparable data in many other states would likely yield larger gaps than those in Colorado. Students who receive institutional grant aid, however, have much higher retention rates than those who don't. This result is largely because recipients of institutional aid in four-year institutions are more likely to have ranked high in their graduating classes in high school, and have higher high school GPAs and entering ACT composite scores that their counterparts. Universities are also targeting at least a portion of their financial aid dollars toward merit instead of need. Finally, nearly five percent more of the students who received loans are retained in the second year.



78.6

80

87.2

100

85.5

Figure 8: First-Year Retention Rates by Financial Aid and Loan Status

Figure 9 displays the retention rates by categories of high school GPAs, high school rankings, and ACT Composite scores. All three have a substantial impact on first- to second-year retention. Students who have high school GPAs of at least 3.0, are ranked in the top half of their high school graduating classes, and have ACT scores of at least 20 or above are much more likely to be retained than their counterparts. On all three variables, the gaps in retention are smaller between the middle and high ends of the scales.

40

60

20

55,361

59,652

49,602

0

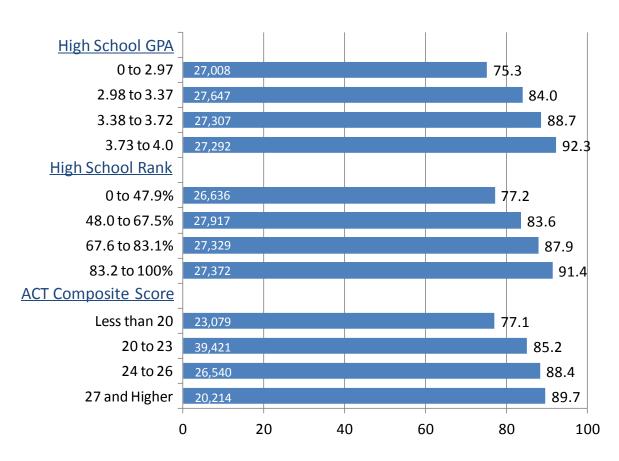
No Institutional Grant

Student Loan

No Student Loan

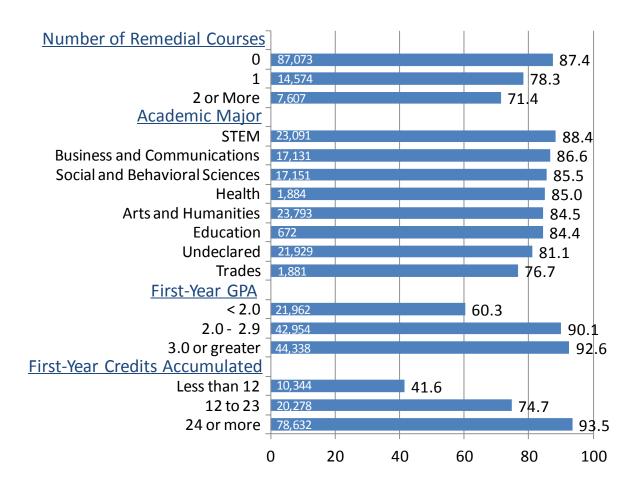
**Student Loan Status** 





At four-year institutions, students who require developmental education have substantially lower retention rates. The relationships between GPA and credit hours accumulated and first-year retention are even more dramatic than those for the community colleges. Students with less than 2.0 GPAs and/or who have accumulated fewer than 12 credit hours during their first academic year are far less likely to be retained. Students who major in science, technology, engineering, and mathematics (STEM) fields have the highest retention rates, and those in trades (though small in numbers) have the lowest rates. (Figure 10 below.)

Figure 10: First-Year Retention Rates by Remedial Status, Academic Major, and First-Year GPA and Credit Hour Accumulation



By and large, students from some of the least populated regions of the state have the lowest retention rates - i.e. those from the South West and West central parts of the state. Also, students who attend Colorado's four-year institutions from out of state are less likely to be retained; the opposite pattern we expected to see, and have seen in other states.

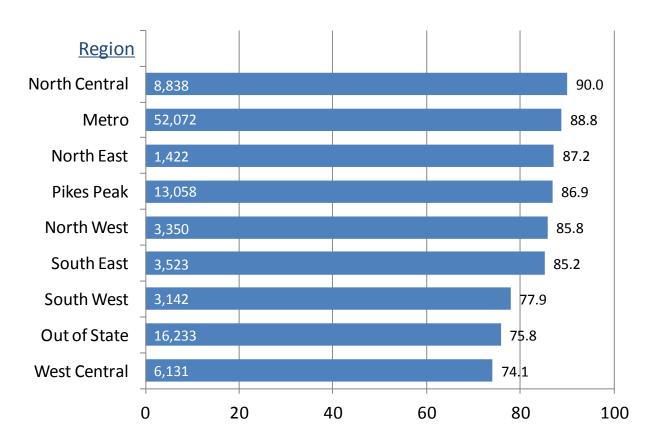


Figure 11: First-Year Retention Rates by Student Region of Origin

#### Transfer from Two- to Four-Year Institutions

During the past decade, several studies have highlighted the movement of students from one institution to another (Adelman, National Student Clearinghouse). There is increasing evidence that more and more students are enrolling in multiple institutions at one time, transferring laterally from four-to-four and two-to-two year colleges, and even reversing the traditional transfer pattern - transferring from four-year to two-year institutions. Figure 12 displays the volume of these activities within the public postsecondary education system in Colorado. While student movement from two- to four-year institutions is still the predominant mode of transfer, the lateral and reverse transfer patterns account for a sizable amount of the activity. In fact, the second most common form of transfer is from four- to four-year institutions.

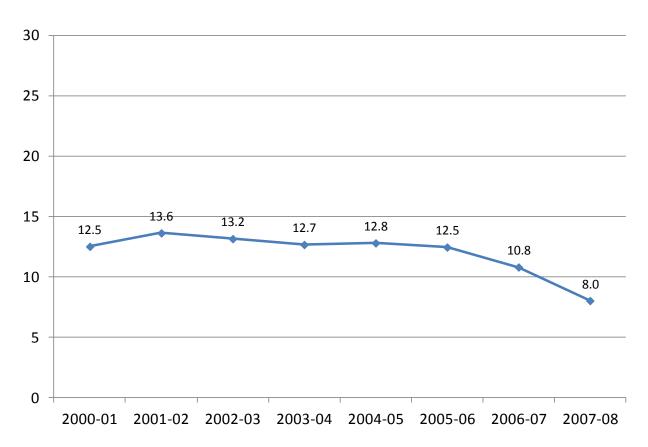
Figure 12: Transfer Patterns in Colorado's Public Postsecondary System (from Fall 2000 to Fall 2010)

2010)					
Transfer Patterns	Number of	Percentage of			
Transfer Patterns	Transfers	Transfers			
Two to Four-Year	23,977	33.6%			
Two to Two-Year	11,638	16.3%			
Four to Four-Year	18,994	26.6%			
Four to Two-Year	16,747	23.5%			
Total	71,356	100.0%			

While there may be some positive student behaviors associated with the swirl of movement across institutions (e.g. students shopping for institutions or courses that better suit their needs, enrolling in institutions where they might have a better likelihood of completion, etc.), the focus of the following sets of analyses are on two- to four-year transfer. This pattern is where most of the state-level policy attention is paid because of the on-going desire among many higher education policymakers to develop a seamless system of transfer between two- and four-year colleges. The hope is that more students who begin at community colleges can pursue baccalaureate degrees with minimal rework and/or credits to degree.

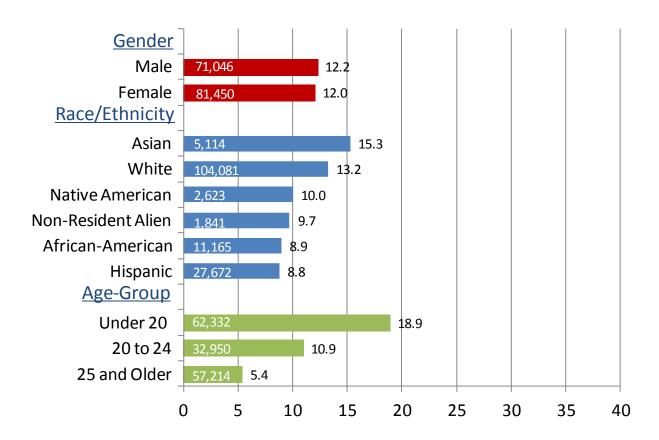
The percentage of community college students who transfer to public four-year institutions in Colorado has remained steady over the past decade – ranging from 12.5 to 13.6 percent (Figure 13). The percentages drop for the later two cohorts in Figure 13 simply because some students will transfer after 2009-10 (the latest year of data analyzed).

Figure 13: Two- to Four-Year Transfer Rates for the Cohorts Beginning from 2000-01 to 2007-08



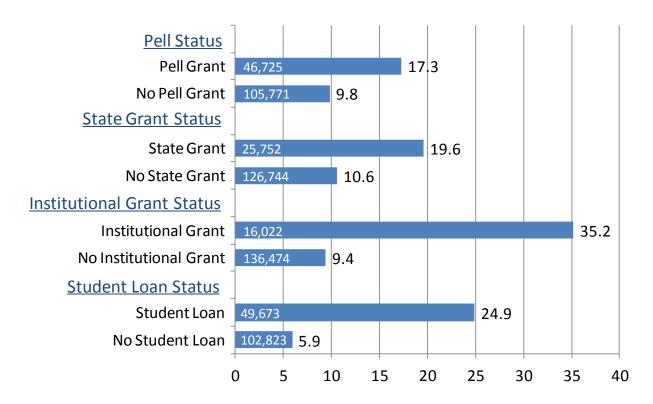
Males and females transfer to four-year institutions at about the same rate. Whites and Asians are much more likely to transfer than Hispanics, African-Americans, and Native Americans. Students who begin at community colleges under the age of 20 are almost twice as likely to transfer as those who begin between the ages of 20 and 24 years, and almost four times more likely than those who wait until they are 25 or older to begin at a community college.

Figure 14: Two- to Four-Year Transfer Rates by Gender, Race/Ethnicity, and Age



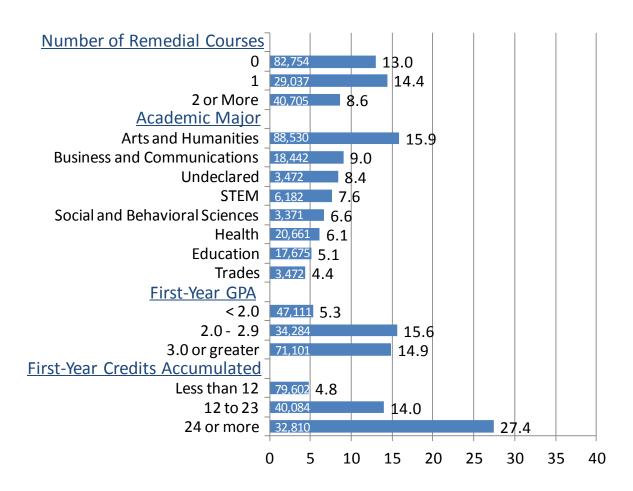
Students who receive federal Pell and state grant aid are nearly twice as likely to transfer as their counterparts. Again, this relationship is explained in large part by the fact that students who receive these sources of financial aid are typically younger and more traditional. More than a third of all students who receive institutional grant aid transfer to four-year institutions, compared to less than 10 percent of those who do not. Community colleges are undoubtedly investing their resources in students who are more likely to pursue four-year degrees. Students who borrow to pay for college are also much more likely to transfer.





Students who are placed in just one or no remedial courses are much more likely to transfer than those who are placed in two or more. Students in good academic standing in their first year – with GPAs of 2.0 or higher – are three times more likely to transfer. The more credit hours students accumulate during their first year, the more likely they are to transfer. Students who attended full-time are nearly six times more likely to transfer than those who earned less than 12 credit hours. Not surprisingly, students who major in arts and humanities are, by far, the most likely to transfer – majors that contain many of the general education courses that are most widely accepted by four-year institutions. Those in trade fields are the least likely to transfer (Figure 16).

Figure 16: Transfer Rates by Remedial Status, Academic Major, and First-Year GPA and Credit Hour Accumulation



Although few in number, nearly a quarter of the community college students from the West Central region of the state transfer to four-year institutions. Students from the Denver metropolitan area are more likely to transfer than those from the remaining regions. Those from the Pikes Peak region are the least likely to transfer.

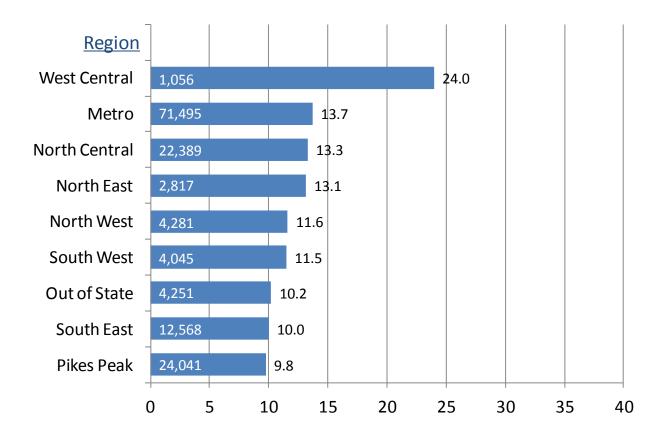


Figure 17: Transfer Rates by Student Region of Origin

#### Findings - Logistic Regression Analyses

While above, we see the simple (univariate) relationships between retention and transfer and a variety of student and institutional characteristics, it is useful to examine models that take all of these characteristics into account at once. Using the independent variables listed in Figure 1, we ran multivariate logistic regression procedures to determine predictors of first-to-second year retention at Colorado's public two- and four-year colleges, and transfer from two- to four-year colleges. Figures that highlight the results of each of the three models are displayed and discussed below. More detailed tables containing all of the statistics associated with the models are provided in Appendix 1.

When taking multiple independent variables into account (determining how predictive they are of retention and transfer), there are many interactive relationships that make regression analyses somewhat difficult to interpret. Despite differences in retention and transfer among certain subpopulations, the explanatory power in the multivariate model may be negated by other factors. For example, there may be substantial differences in first-year retention rates between Whites and Hispanics that are as much a function of family income and vise-versa. In these cases, it is common to see one of the two factors driving the bulk of explanation of the variance in retention rates. Therefore it is important to examine the interactions among the independent variables as well - e.g. in this case the relationship between race/ethnicity and family income. These will be highlighted throughout the explanations of the models; and the results of these interactions are shown in Appendix 2.

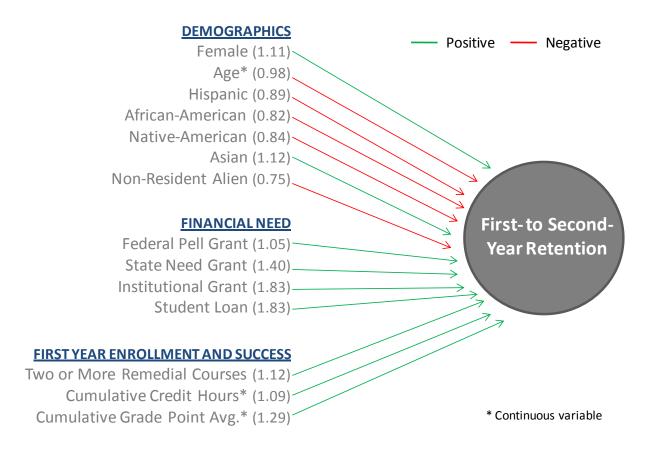
When these types of models are conducted with large numbers of cases (in this case, the numbers of students), nearly all relationships between independent and dependent variables are statistically significant - even those that have minimal effect on the model. For this study, there are 170,000 cases in the two-year retention model, 109,000 in the four-year retention model, and 151,000 in the two- to four-year transfer model. Therefore, "effect sizes" will be discussed for each of the independent variables - identifying those that have the highest levels of predictability of retention and transfer. Below are the results of the three logistic regression models.

#### Model 1: Retention at Public Two-Year Colleges

Figure 18 displays a summary of the logistic regression model for retention at public two-year colleges. The variables on the left of the diagram are the independent variables and first-to-second year retention is the dependent variable. The majority of independent variables are "categorical" with values in the model representing certain subpopulations or whether or not students received an intervention. In this model these include the variables for gender, race/ethnicity, grants and loans, and remedial courses. In each case, the groups that are missing from the model are the "reference" groups. For example, "female" is the variable in the model and "male" is the reference group. The model is testing whether the likelihood of first-year retention among females is different than for males - when controlling for all of the other independent variables. For the categorical variables, the values shown in Figure 18 represent odds ratios compared to the reference group. For example, after controlling for all other variables in the model, females are 11% more likely to be retained in year two than males (where a value of 1.0 would be exactly the same as males, the reference group in this case).

The other independent variables (those with an \*) are "continuous", meaning there is incremental order from low to high. These include age, cumulative credit hours, and cumulative GPA. The values in Figure 18 cannot be interpreted as probabilities, therefore, we will infer their strength in the model from the "Wald" statistic available in Appendix 1 - where the highest values indicate the strength of each independent variable's contribution to the explanation of retention. The above explanation holds throughout the interpretation of the next two regression models as well.

Figure 18: Logistic Regression Model for First-to-Second Year Retention at Public Two-Year Colleges



When controlling for the interaction effects of all of the independent variables, the following summarizes the relationships between them and first-to-second year retention:

- 1. Females are 11 percent more likely to be retained than males.
- 2. Students who begin community college at a younger age are more likely to be retained.
- 3. Hispanic students are 11 percent less likely to be retained than Whites.
- 4. African-Americans are 18 percent less likely to be retained than Whites.
- 5. Native Americans are 16 percent less likely to be retained than Whites.
- 6. Asians are 18 percent more likely to be retained than Whites.
- 7. Students who receive federal Pell grants are 5 percent more likely to be retained than those who do not. Although, they are also much younger in age (Appendix 2).

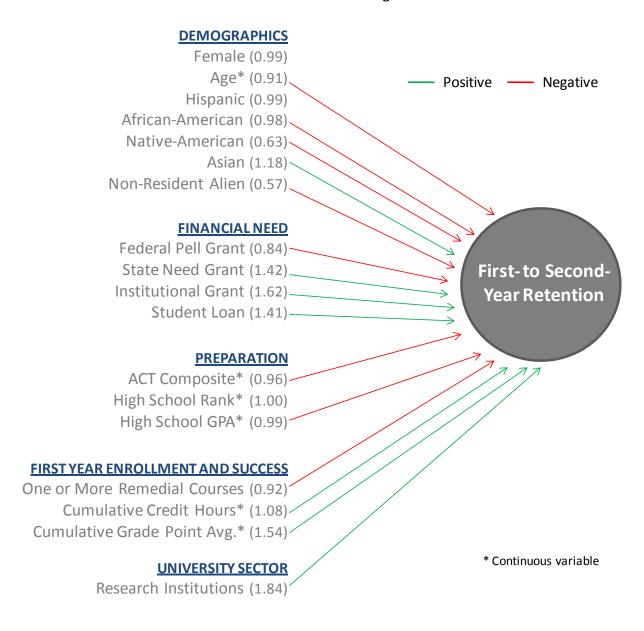
- 8. Students who receive state need-based grant aid are 40% more likely to be retained. These students are also much younger than their counterparts (Appendix 2).
- 9. Students who receive institutional grant aid are 83 percent more likely to return their second year. These students are much younger than their counterparts (Appendix 2).
- 10. Those who borrow to attend college are also much more likely to be retained (83 percent); though they are also much younger than students who do not take out loans.
- 11. Surprisingly, students who are placed into two or more remedial courses are 12 percent more likely to return their second year. Then again, Appendix 2 indicates that these are typically much younger students, and more likely to attend full-time (accumulating more credit hours during their first year).
- 12. Both cumulative credit and grade point average (GPA) during the first year of college impact retention substantially.

The Wald statistics in Appendix 1 indicate that, by far, the most influential predictors of retention at public two-year colleges - i.e. students who are most likely to return their second year (in order): had more cumulative credit hours and higher GPAs during the first year of college, received a loan to pay for college, are younger in age, received an institutional grant award and a state grant award to pay for college. For community colleges, enrollment intensity, academic success, and financial aid make a difference in student's ability to persist in college.

#### Model 2: Retention at Public Four-Year Colleges

Figure 19 displays a summary of the results of the logistic regression model for first-to-second year retention at public four-year institutions. The four-year institutions collect data necessary to gauge the impact of preparation for college including independent variables for ACT Composite scores (with SAT scores converted using the College Board's concordance table), high school grade point average, and high school rank. When controlling for the interaction effects of all of the independent variables, the following summarizes the relationships between them and first-to-second year retention:

Figure 19: Logistic Regression Model for First-to-Second Year Retention at Public Four-Year Colleges



- 1. There is no statistically significant difference in the retention rates between females and males.
- 2. Students who begin college at a younger age are more likely to return their second year.
- 3. There are no statistically significant differences in retention between Hispanics and Whites. Although, Hispanics are have lower ACT scores, high school rankings, and high school GPAs than Whites which explain the lack of the direct effect on retention. If Hispanics were as well prepared, they would do just as well as Whites. The same relationships exist among African-Americans.

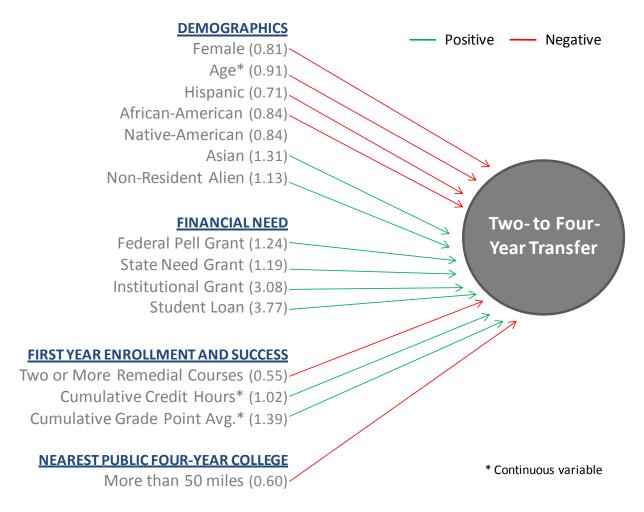
- 4. Native Americans are 37 percent less likely to be retained than whites.
- 5. Asians are 18 percent more likely to be retained than Whites.
- 6. Students receiving federal Pell grants are 16 percent less likely to return their second year. This contrasts the pattern at two-year colleges.
- 7. However, students who receive state grant aid are 40 percent more likely to be retained.
- 8. Students who receive institutional aid are 62 percent more likely to return their second year. This result can be explained, in large part, by the fact that these students have (on average) higher ACT scores, high school rankings, and high school GPAs; and are less likely to receive Pell grants (Appendix 2) an indication that a substantial portion of institutional aid provided by public four-year colleges is merit based as opposed to need-based.
- 9. Students who receive loans to pay for college are 41 percent more likely to be retained.
- 10. Because race/ethnicity and income are so highly predictive of college preparation (Appendix 2), their impact on the model negate the effects of the three college preparation variables (ACT scores and high school rank and GPA). While ACT scores and high school GPA are statistically significant, their effect sizes are rather small compared to other independent variables in the model.
- 11. Unlike students at community colleges, those at universities who require remedial courses are 8 percent less likely to return their second year.
- 12. Like those at community colleges, university students are much more likely to be retained if they accumulate more credit hours and have higher GPAs during their first year of college.
- 13. Students attending the state's research universities (UC Boulder, CSU Fort Collins, CO School of Mines, and Northern Colorado University) are significantly more likely to return their second year.

The Wald statistics in Appendix 1 indicate that the most influential predictors of retention at public four-year colleges i.e. students who are most likely to return their second year (in order): had more cumulative credit hours and higher GPAs during the first year of college, were enrolled in a research university, received an institutional grant award and a state grant award to pay for college. For universities as well as community colleges, enrollment intensity, academic success, and financial aid make a difference in student's ability to persist in college.

#### Model 3: Transfer from Two- to Four-Year Colleges

Figure 20 highlights the results of the logistic regression procedure for student transfer from two-to four-year public colleges. When controlling for the interaction effects of all of the independent variables, the following summarizes the relationships between them and transfer from two- to four year colleges:

Figure 20: Logistic Regression Model for Transfer from Public Two-Year Institutions to Public Four-Year Institutions



- 1. Females in community colleges are 20 percent less likely than males to transfer to public fouryear institutions.
- 2. Younger students are much more likely to transfer.
- 3. Hispanics are 29 percent less likely to transfer, African-Americans and Native Americans are 16 percent less likely to transfer, and Asians are 31 percent more likely to transfer.
- 4. Students who receive federal Pell and state grant awards are more likely to transfer. Again, these students tend to be younger in age and accumulate more credit hours than older students.
- 5. Those who receive institutional grant aid and loans to pay for college are almost four times more likely to transfer to four-year institutions.
- 6. Students who are placed in two or more remedial courses are 45 percent less likely to transfer.

- 7. Students who accumulate more credit hours and have higher GPAs during their first year of college are much more likely to transfer to four-year institutions.
- 8. Students who attend community colleges that are 50 miles or more from the nearest four-year institution are 40 percent less likely to transfer.

The Wald statistics in Appendix 1 indicate that the most influential predictors of transfer from public two-year to four-year colleges - i.e. students who are most likely to transfer (in order): received student loans to pay for college, were younger when they entered college, received a state need-based grant, accumulated more credit hours and had higher GPAs during their first year of college.

## **Policy Implications**

Considerable attention has been paid toward better understanding policies and intervention methods that can effectively increase college retention and successful transfer from community college into the four-year sector. Arguably, the past decade in higher education policy has seen a considerable shift from strictly focusing on college access toward a broader definition of college success to include retention and transfer. This effort has, in part, been amplified by discussion and a sense of urgency both within the state as well as through purposeful advocacy from outside agencies, foundations, and external stakeholders. The confluence of this research and work has led to several important findings that together provide clearer insights into successful intervention strategies for increasing college retention and transfer at the state system level.

Persistence from a student's first to second year of college has increasingly become a standard metric of success for many institutions. From a state system perspective, the accumulation of academic credit toward a college degree is generally the banner under which retention efforts are marshaled. However, several common characteristics emerge when unpacking completion of academic credit hours, as Adelman (2006) points out in the influential work "The Toolbox Revisited":

- **First-year credit generation**, i.e., the goal of making sure that postsecondary students end their first year of enrollment with 20 or more credits.
- The overuse of no-penalty withdrawals and no-credit repeats. Institutional policy and advising can cut the incidence of withdrawals and course repetition.
- Use of summer terms. Enrollment management can move sections of high demand courses into summer terms, offer credit-bearing internships in summer terms, and engage in other creative initiatives that will also optimize use of institutional resources over what has become an academic calendar year.
- **No delay of entry**. Tuning recruitment strategy among high school students whose commitment to postsecondary education is less than fervid.

The high school curriculum component of "Academic Resources." This is not a case of "little-to-modest" effort or a small population. It is a work in progress, much of which depends on students' reading skills on entering high school. If students cannot read close to grade level, the biology textbook, mathematics problems, history documents, novels—all will be beyond them.

Within those five characteristics, several potential policy interventions begin to emerge. Many states have worked to tune their policies toward increasing college retention. In particular, Shulock and Moore (2010) point to several strategies that may be beneficial to consider:

- A new funding model which rewards colleges for helping students progress through milestones, including completing college-level English and mathematics, and for helping under-prepared students meet key milestones.
- Changes to system policy to ensure that all degree-seeking students are assessed for college readiness, and are directed appropriately into courses that will expedite their transition to and success in college-level instruction.
- Legislative steps to guard against erosion of the historic transfer function of community colleges
  by investigating recruiting practices and completion rates at for-profit colleges, enacting policies
  that encourage students to earn associate degrees prior to transfer, and ensuring sufficient
  capacity in public four-year colleges and universities for those students.

As mentioned in the last bullet point, policies aimed at college completion and retention must also serve to benefit those seeking successful transfer; in particular, transfer from the two-year to the four-year college sector. Within the extant research surrounding college transfer, several barriers to successful college transfer can be found, including faculty resistance to accept community college credits as equivalent to credits in a four-year institution (Hezel, 2010).

Most common practices around college transfer include a "common core" of data, course numbering, and transfer / articulation agreements as defined by the state. Furthermore, several distinct intervention approaches also emerge around ensuring successful transfer:

#### **Statewide Collaboration**

- Develop a statewide, standing committee to focus on multi-institution transfer and articulation.
- Involve faculty in policy development and implementation.

#### **Communication of Policies**

- Establish a state-level office / official whose sole or primary purpose is to facilitate a statewide approach to transfer and articulation.
- Designate campus or state-level personnel as contacts for transfer and articulation issues.
- Build a strong presence for articulation and transfer on the Web.
- Include student feedback in articulation and transfer policies and practices.

#### **Academic Policy**

- Provide clear transfer pathways for community college students who have selected a program major.
- Develop a clear pathway for community college students to meet common general education requirements.

• Implement guaranteed admission policies for community college students who have met all transfer-related benchmarks.

#### **Use of Data**

- Evaluate transfer and articulation policies and statutes, as well as transfer students' progress.
- Assess student success through quantitative measures of individual student-level indicators of performance.
- Expand the reporting of results of transfer and articulation and assessment.

#### **Additional Promising Practices**

- Publish a transfer student bill of rights to specify the treatment transfer students can expect during their transition.
- Establish financial assistance programs that actively support student transfers from two- to four-year institutions.
- Provide funding incentives to institutions that perform well in terms of student transfers.
- Provide alternate pathways to degree completion.

Regardless of the particular intervention pattern or system in place, success in these endeavors hinges upon the ability of that method to help students move efficiently through their programs, yielding a greater ease of transfer and ultimately helping the state to produce more college-educated workers. Therefore, successful interventions should incorporate processes that are effective in both creating a clear pathway toward four-year transfer while minimizing the number of extraneous credits a student can earn on the pathway toward transfer. Finally, a successful transfer program balances stakeholder desires for change with institutional interests in setting standards and requirements for transfer. This includes the development of state-level articulation policies, cooperative agreements, transfer data reporting, clear incentives for transfer, and clear descriptions of the requirements within the transfer process (ECS, 2010).

#### Conclusion

Across the board, race/ethnicity is a significant predictor of success. At two-year colleges, Hispanics, African-Americans, and Native Americans are less likely to be retained their second year and less likely to transfer to public four-year institutions. The retention gaps between whites and minorities are not as wide in the universities. However, minorities are much less likely to earn the necessary grades in high school or score well enough on the ACT to even enter many universities. Given the demographic shifts taking place in Colorado, with minority populations growing at much higher rates than whites, any progress made in the educational attainment of the state's adult population must largely be the result of improving the college success rates of disadvantaged and underserved populations.

Second, traditional-aged students are retained in their second year and transfer at much higher rates than their counterparts. While many older adult students entering community colleges may not desire (or have the time) to transfer to a four-year institution to earn a bachelor's degree, it is imperative that more of them persist to meaningful industry-recognized credentials. This outcome is particularly important in the current economy where more specialized skills are needed for relatively large numbers of older adults who are unemployed, and seeking alternative careers in occupations that will yield

middle-class wages. Closing the gaps in performance between traditional-aged and older adult students primarily rests on the shoulders of community colleges since they serve the vast majority of older students either entering college as first-time students later in life, or returning to college for short-term retraining.

Enrollment intensity matters a great deal. Lack of enrollment intensity is highly correlated with the age of students - older adult students are much more likely to fail in their pursuit of a college credential as a result of too few credits earned during the first year or two of college (leaving them with the impression that too much time is needed to reach their goal). The degree to which state and institutional policy can generate (or incentivize) more credit hours of enrollment among students early in their college experiences, the greater the success rates of those students. This result can be achieved through financial aid programs that are better targeted to older adult students, making key courses available during times that are more suitable for working adults, and providing more effective support services to older, working adults.

The positive impacts of Colorado's need-based financial aid program on retention and transfer (particularly at the community colleges) is unfortunately masked by the relationship between its provision and the age and enrollment intensity of students. Since state grant aid is disproportionately provided to younger students who enroll full-time, it is difficult to determine its overall impact on student success. The program certainly provides college access to younger students, and they perform relatively well compared to their counterparts without grant aid. Based on the results of the analyses, however, it would be misguided to suggest that the state financial aid program is not effective. But, ; if the grant aid were made more readily available to older students, it would have a greater impact.

After reviewing all of the statistical relationships among the variety of variables associated with retention and transfer, it is our general conclusion that race/ethnicity, age, enrollment intensity, and state need-based financial aid are the most important considerations for Colorado's postsecondary education policymakers and stakeholders. They are not at all mutually exclusive. As the future unfolds, if Colorado is to maintain its position as one of the most educated states in the U.S., more policy attention must be paid to these issues - at the state and institutional levels. This is particularly true if the state wants to realize its goal of 66 percent of the adult population with college degrees by the year 2025.

## **Appendices and Tables**

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## Appendix 1-1: Summary Table of Logistic Regression Analysis on retention from Two-Year Public Higher Education in Colorado (n=170486)

#### **Case Processing Summary**

Unweighted Cases a		N	Percent
Selected Cases	Included in Analysis	170486	99.2
	Missing Cases	1356	.8
	Total	171842	100.0
Unselected Cases		0	.0
Total		171842	100.0

a. If weight is in effect, see classification table for the total number of cases.

## **Dependent Variable Encoding**

Original Value	Internal Value
0	0
1	1

#### Classification Table<sup>a,b</sup>

			Predicted		
			ret1	y rlt r	Percentage
	Observed		0	1	Correct
Step 0	ret1y rlt r	0	0	81490	.0
		1	0	88996	100.0
	Overall Percentage				52.2

a. Constant is included in the model.

#### Variables in the Equation

		В	9 E	Wald	df	Sia.	Exp(B)
		Ь	ა. ⊑.	l vvalu	l ui	Sig.	EXP(D)
Step 0	Constant	.088	.005	330.254	1	.000	1.092

b. The cut value is .500

## Variables not in the Equation

			Score	df	Sig.
Step	Variables	Female	535.499	1	.000
0		age	2254.514	1	.000
		Hispanic	198.469	1	.000
		Black	349.019	1	.000
		Native_American	23.519	1	.000
		Asian_PI	40.686	1	.000
		NonResAlien	1.857	1	.173
		f af edpell	3155.330	1	.000
		fastudgrant	3872.949	1	.000
		fainstaw	4822.034	1	.000
		studentloan	9543.969	1	.000
		Remedial_2_More	3.074	1	.080
		cumcredit	30790.691	1	.000
		cumgpa	18083.875	1	.000
	Overall Statistics		44006.192	14	.000

#### **Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	56178.511	14	.000
	Block	56178.511	14	.000
	Model	56178.511	14	.000

## **Model Summary**

Step	-2 Log	Cox & Snell	Nagelkerke
	likelihood	R Square	R Square
1	179834.70 <sup>a</sup>	.281	.375

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

#### Classification Table

			Predicted_		
			ret1	y rlt r	Percentage
	Observed		0	1	Correct
Step 1	ret1y rlt r	0	61845	19645	75.9
		1	23199	65797	73.9
	Overall Percentage				74.9

a. The cut value is .500

#### Variables in the Equation

								95.0% C.I.	for EXP(B)
		В	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step	Female	.107	.012	83.199	1	.000	1.113	1.088	1.139
1	age	018	.001	892.133	1	.000	.982	.981	.983
	Hispanic	112	.016	52.346	1	.000	.894	.867	.921
	Black	197	.023	76.157	1	.000	.821	.785	.858
	Native_American	176	.045	15.416	1	.000	.839	.768	.916
	Asian_PI	.161	.032	24.880	1	.000	1.175	1.103	1.252
	NonResAlien	294	.053	30.863	1	.000	.746	.672	.827
	f af edpell	.045	.016	7.709	1	.005	1.046	1.013	1.080
	fastudgrant	.334	.018	331.133	1	.000	1.397	1.348	1.448
	fainstaw	.603	.022	783.228	1	.000	1.828	1.752	1.907
	studentloan	.605	.014	1816.514	1	.000	1.832	1.781	1.883
	Remedial_2_More	.115	.013	73.516	1	.000	1.122	1.093	1.152
	cumcredit	.086	.001	14761.759	1	.000	1.090	1.088	1.091
	cumgpa	.253	.005	2560.681	1	.000	1.287	1.275	1.300
	Constant	-1.493	.021	4921.722	1	.000	.225		

a. Variable(s) entered on step 1: Female, age, Hispanic, Black, Nativ e\_American, Asian\_PI, NonResAlien, fafedpell, fastudgrant, fainstaw, studentloan, Remedial\_2\_More, cumcredit, cumgpa.

## Appendix 1-2: Summary Table of Logistic Regression Analysis on retention from Two-Year Public Higher Education in Colorado (n=109254)

#### **Case Processing Summary**

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	109229	100.0
	Missing Cases	25	.0
	Total	109254	100.0
Unselected Cases		0	.0
Total		109254	100.0

a. If weight is in effect, see classification table for the total number of cases.

## **Dependent Variable Encoding**

Original Value	Internal Value
0	0
1	1

## Classification Table<sup>a,b</sup>

			Predicted			
		ret1y rltr		Percentage		
	Observed		0	1	Correct	
Step 0	ret1y rlt r	0	0	16273	.0	
		1	0	92956	100.0	
	Overall Percentage				85.1	

a. Constant is included in the model.

## Variables in the Equation

	В	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Const	ant 1.743	.008	42054.450	1	.000	5.712

## Variables not in the Equation

			Score	df	Sig.
Step	Variables	Female	153.428	1	.000
0		age	359.951	1	.000
		Hispanic	167.044	1	.000
		Black	40.521	1	.000
		Native_American	474.388	1	.000
		Asian_PI	35.765	1	.000
		NonResAlien	.590	1	.443
		f af edpell	131.337	1	.000
		fastudgrant	2.980	1	.084
		fainstaw	3732.073	1	.000
		studentloan	475.413	1	.000
		actconv ert	1747.017	1	.000
		hsgpa	3895.529	1	.000
		hsrank	2680.366	1	.000
		Res_Sector	3561.895	1	.000
		Remedial_Course	1848.705	1	.000
		cumcredit	16577.162	1	.000
		cumgpa	15480.358	1	.000
	Overall Statistics		22616.228	18	.000

#### **Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	21339.414	18	.000
	Block	21339.414	18	.000
	Model	21339.414	18	.000

b. The cut value is .500

#### **Model Summary**

	-2 Log	Cox & Snell	Nagelkerke
Step	likelihood	R Square	R Square
1	70617.581 <sup>a</sup>	.177	.312

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

#### Classification Tabl €

			Predicted			
			ret1	y rlt r	Percentage	
	Observed		0	1	Correct	
Step 1	ret1y rlt r	0	4742	11531	29.1	
		1	2551	90405	97.3	
	Overall Percentage				87.1	

a. The cut value is .500

#### Variables in the Equation

								95.0% C.I.	for EXP(B)
		В	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step	Female	014	.020	.464	1	.496	.986	.948	1.026
1	age	091	.009	108.512	1	.000	.913	.897	.929
	Hispanic	002	.031	.004	1	.949	.998	.939	1.061
	Black	022	.053	.172	1	.678	.978	.881	1.086
	Native_American	464	.057	65.764	1	.000	.629	.562	.703
	Asian_PI	.167	.049	11.469	1	.001	1.182	1.073	1.302
	NonResAlien	570	.260	4.806	1	.028	.566	.340	.941
	f af edpell	174	.028	38.181	1	.000	.840	.795	.888
	fastudgrant	.354	.033	115.437	1	.000	1.424	1.335	1.519
	fainstaw	.481	.022	465.010	1	.000	1.618	1.548	1.690
	studentloan	.341	.021	265.133	1	.000	1.406	1.349	1.465
	actconv ert	037	.003	118.008	1	.000	.964	.958	.970
	hsgpa	004	.000	92.350	1	.000	.996	.995	.997
	hsrank	.000	.000	.155	1	.694	1.000	1.000	1.000
	Res_Sector	.607	.023	688.592	1	.000	1.835	1.754	1.921
	Remedial_Course	080	.027	8.543	1	.003	.924	.876	.974
	cumcredit	.078	.001	3827.804	1	.000	1.081	1.078	1.084
	cumgpa	.434	.013	1084.621	1	.000	1.544	1.504	1.584
	Constant	2.085	.206	102.598	1	.000	8.041		

a. Variable(s) entered on step 1: Female, age, Hispanic, Black, Native\_American, Asian\_PI, NonResAlien, fafedpell, fastudgrant, fainstaw, studentloan, actconvert, hsgpa, hsrank, Res\_Sector, Remedial\_Course, cumcredit, cumgpa.

Appendix 1-3: Summary Table of Logistic Regression Analysis on transfer from Two-Year to Four-Year Public Higher Education in Colorado (n=152496)

## Case Processing Summary

Unweighted Cases a		N	Percent
Selected Cases	Included in Analysis	151387	99.3
	Missing Cases	1109	.7
	Total	152496	100.0
Unselected Cases		0	.0
Total		152496	100.0

a. If weight is in effect, see classification table for the total number of cases.

## **Dependent Variable Encoding**

Original Value	Internal Value
0	0
1	1

## Classification Table<sup>a,b</sup>

			Predicted					
			twof	Percentage				
	Observed		0	1	Correct			
Step 0	twof our	0	132983	0	100.0			
		1	18404	0	.0			
	Overall Percentage				87.8			

a. Constant is included in the model.

## Variables in the Equation

		В	S.E.	Wald	df	Sia.	Exp(B)
Step 0	Constant	-1.978		63229.547	1	.000	.138

b. The cut value is .500

## Variables not in the Equation

			Score	df	Sig.
Step	Variables	Female	1.957	1	.162
0		age	3979.339	1	.000
		Hispanic	344.514	1	.000
		Black	106.323	1	.000
		Native_American	10.984	1	.001
		Asian_PI	53.984	1	.000
		NonResAlien	10.037	1	.002
		f af edpell	1751.792	1	.000
		fastudgrant	1676.251	1	.000
		fainstaw	8968.789	1	.000
		studentloan	11295.897	1	.000
		Distance	4.608	1	.032
		Remedial_2_More	630.581	1	.000
		cumcredit	7990.659	1	.000
		cumgpa	2666.491	1	.000
	Overall Statistics		24892.757	15	.000

#### **Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	24967.103	15	.000
	Block	24967.103	15	.000
	Model	24967.103	15	.000

## **Model Summary**

	-2 Log	Cox & Snell	Nagelkerke
Step	likelihood	R Square	R Square
1	87071.371 <sup>a</sup>	.152	.291

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

## Classification Table

			Predicted					
			twof	our	Percentage			
	Observed .		0	1	Correct			
Step 1	twof our	0	130634	2349	98.2			
		1	15249	3155	17.1			
	Overall Percentage				88.4			

a. The cut value is .500

Variables in the Equation

								95.0% C.I.	for EXP(B)
		В	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step	Female	215	.018	145.021	1	.000	.806	.779	.835
1	age	090	.002	3255.789	1	.000	.914	.911	.916
	Hispanic	338	.026	170.512	1	.000	.713	.678	.750
	Black	180	.038	22.116	1	.000	.835	.775	.900
	Native_American	177	.073	5.867	1	.015	.838	.726	.967
	Asian_PI	.270	.046	35.119	1	.000	1.310	1.198	1.433
	NonResAlien	.120	.085	2.009	1	.156	1.128	.955	1.332
	f af edpell	.217	.022	98.100	1	.000	1.243	1.190	1.297
	fastudgrant	.175	.023	56.149	1	.000	1.191	1.138	1.247
	fainstaw	1.126	.022	2586.484	1	.000	3.084	2.953	3.221
	studentloan	1.327	.020	4469.330	1	.000	3.769	3.625	3.918
	Distance	517	.026	407.398	1	.000	.596	.567	.627
	Remedial_2_More	598	.022	729.448	1	.000	.550	.527	.574
	cumcredit	.019	.000	1597.665	1	.000	1.020	1.019	1.021
	cumgpa	.327	.009	1388.296	1	.000	1.387	1.363	1.411
	Constant	-1.621	.042	1455.103	1	.000	.198		

a. Variable(s) entered on step 1: Female, age, Hispanic, Black, Native\_American, Asian\_PI, NonResAlien, fafedpell, fastudgrant, fainstaw, studentloan, Distance, Remedial\_2\_More, cumcredit, cumgpa.

Appendix 2-1: First-Year Retention at Community Colleges - Pearson Correlations between Level 1 Variables

Level 1 Measures	Female	Age*	White	Hispanic	Black	Native American	Asian	Pell Recipient	State Grant Recipient	Institutional Grant Recipient	Student Loan
Female											
Age*	1.36										
White	0.87	0.39									
Hispanic	1.20	-0.86									
Black	1.06	0.90									
Native American	0.97	0.68									
Asian	1.03	-0.65									
Pell Recipient	1.67	-1.70	0.54	1.77	2.06	1.35	1.05				
State Grant Recipient	1.51	-1.92	0.67	1.45	1.56	1.24	1.05	24.54			
Institutional Grant Recipient	1.17	-2.79	1.10	0.98	0.87	0.92	0.96	1.14	1.25		
Student Loan	1.43	-2.90	0.93	1.07	1.38	1.08	0.84	7.55	5.83	3.48	

<sup>\*</sup> Difference in Means

Appendix 2-2: First-Year Retention at Public Universities - Pearson Correlations between Level 1 Variables

Level 1 Measures	Female	Age*	White	Hispanic	Black	Native American	Asian	Pell Recipient	State Grant Recipient	Institutional Grant Recipient	Student Loan	ACT Composite *	High School GPA*	High School Rank*
Female														
Age*	-0.15													
White	0.91	0.03												
Hispanic	1.13	0.00												
Black	0.51	-0.06												
Native American	1.21	0.11												
Asian	0.99	-0.13												
Pell Recipient	1.19	0.15	0.34	2.40	3.57	2.14	1.86							
State Grant Recipient	1.13	0.08	0.44	2.16	2.82	0.85	1.62	27.51						
Institutional Grant Recipient	1.17	-0.13	0.95	0.95	1.07	0.78	1.45	0.89	0.87					
Student Loan	1.14	0.04	0.62	1.62	2.76	1.29	1.06	4.40	4.20	1.71				
ACT Composite**	-0.59	-0.09	2.30	-2.24	-3.14	-2.19	-0.56	-1.70	-1.58	2.12	-0.61			
High School GPA**	0.17	-0.11	0.14	-0.15	-0.27	-0.18	0.08	-0.11	-0.11	0.36	-0.03	0.46		
High School Rank**	7.84	-0.09	1.40	-2.82	-4.75	-3.15	4.98	-1.75	-2.03	14.48	0.61	0.37	0.87	

<sup>\*</sup> Difference in Means

Appendix 2-3: First Transfer from Community Colleges to Public Four-Year Institutions - Pearson Correlations between Level 1 Variables

Level 1 Measures (N =	Female	Age*	White	Hispanic	Black	Native American	Asian	Pell Recipient	State Grant Recipient	Institutional Grant Recipient	Student Loan	Distance from 4-Y
Female												
Age*	1.36											
White	0.87	0.39										
Hispanic	1.20	-0.86										
Black	1.06	0.90										
Native American	0.97	0.68										
Asian	1.03	-0.65										
Pell Recipient	1.67	-1.70	0.54	1.77	2.06	1.35	1.05					
State Grant Recipient	1.51	-1.92	0.67	1.45	1.56	1.24	1.05	24.54				
Institutional Grant Recipient	1.17	-2.79	1.10	0.98	0.87	0.92	0.96	1.14	1.25			
Student Loan	1.43	-2.90	0.93	1.07	1.38	1.08	0.84	7.55	5.83	3.48		
Distance from Nearest 4-Year	0.89	-1.60	1.12	1.45	0.44	0.99	0.22	1.26	1.10	3.10	1.16	

<sup>\*\*</sup> Continuous Variables